

CLINICAL SUGGESTION

THORACIC REGION SELF-MOBILIZATION: A CLINICAL SUGGESTION

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ABSTRACT

Limitations in thoracic spine motion may be due to restrictions in contractile or non-contractile tissues. Joint mobilizations are indicated when hypomobility of a joint (non-contractile tissue) is identified. The ability for a patient to perform self-mobilizations of the thoracic spine and ribs may help maximize intervention outcomes. The purpose of this article is to describe a low cost, portable device which can be used for thoracic spine self-mobilization techniques.

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PROBLEM

Musculoskeletal pathology of the thoracic spine and ribs is often thought to be self-limiting in nature.¹ Recent interest in the thorax from a clinical perspective has been related to the recognition of the thoracic spine and ribs not only as a source of local and referred pain but also the influence of thoracic spine mobility on movement patterns in other regions of the spine and the shoulder girdle.² Range of motion (ROM) in the thoracic region is necessary for a number of daily activities and sporting tasks such as golf, throwing sports, tennis, and rowing. Dysfunction of the thoracic spine can also play a role in breathing difficulties and may be linked to postural issues in the later stages of life.²

Movement of the thoracic spine is coupled with movement of the adjoining ribs.³ Thoracic extension involves concurrent posterior rotation (external torsion) and depression of the posterior ribs with elevation of the anterior ribs.³ Although difficult to separate thoracic spine motion from the movement of surrounding structures, accepted approximate normative values have been described for thoracic spine flexion (20° to 45°), extension (25° to 45°), side-bending (20° to 40°), and rotation (35° to 60°).⁴⁻⁶ These measures are often assessed clinically using a tape measure, standard goniometer, inclinometer, or via visual assessment.⁶⁻¹⁰

Restrictions in motion have the potential to impact performance and may manifest as local or distant musculoskeletal pathology.^{1,11-13} Motion restrictions may be due to contractile or non-contractile structures, and interventions to address each specific tissue restriction can vary depending on the source of the involved tissue. Contractile restrictions (muscle tightness, trigger points) may be identified by examining physiological ROM and with muscle palpation, while non-contractile restrictions may be identified by examining joint arthrokinematics and classifying them as normal, hypermobile, or hypomobile. Contractile restrictions may be addressed via muscle stretching or manual interventions such as soft-tissue mobilization or sustained pressure. Joint hypermobility is usually addressed with therapeutic exercise to improve neuromuscular control while joint hypomobility may be addressed with manual interventions including joint mobilization and

manipulation. Hypomobility of vertebral and costovertebral joints in the thoracic spine may prevent the patient from attaining full motion of the thorax.² Most interventions to address thoracic spine mobility are dependent on the clinician providing the intervention. The ability for the patient to incorporate self-mobilizations of the thoracic spine into therapeutic exercise programs may help maximize intervention outcomes. Additionally, self-mobilizations are active interventions versus passive mobilization techniques provided by the clinician and may be useful in busy clinical environments (i.e. sports medicine clinic, athletic training room). The ability to perform thoracic spine self-mobilization techniques is often associated with the use of foam rollers. Although the use of the foam roller is common, associated costs as well as portability (airline travel) may limit use in some clinical environments. The purpose of this manuscript is to provide an alternative device that is low cost and portable, which may be used for thoracic spine self-mobilization techniques.

SOLUTION

The self-mobilization techniques described involve the use of a device that can be easily made in any athletic training room, sports medicine clinic, or fitness facility. This device requires two tennis balls and half-inch athletic tape. The two tennis balls are held together, and tape is applied from one end of a tennis ball and encircled around crossing to the opposite end of the other tennis ball and back to the original starting point—making a complete ellipse shape (Figure 1). Continuous or separate strips of elliptically-shaped tape are applied, in this manner, until both tennis balls have been completely covered by athletic tape. One last strip of tape is applied with taut pressure perpendicular to the ellipse-shaped strips between the two tennis balls. This should further accentuate the groove between the two balls which will be helpful when aligning the device with the spinous processes of the thoracic spine during the self-mobilization intervention.

Thoracic Spine Mini-Crunches

The self-mobilization thoracic spine technique can be used in conjunction with mobilization interventions provided by a clinician. Joint mobilizations may be

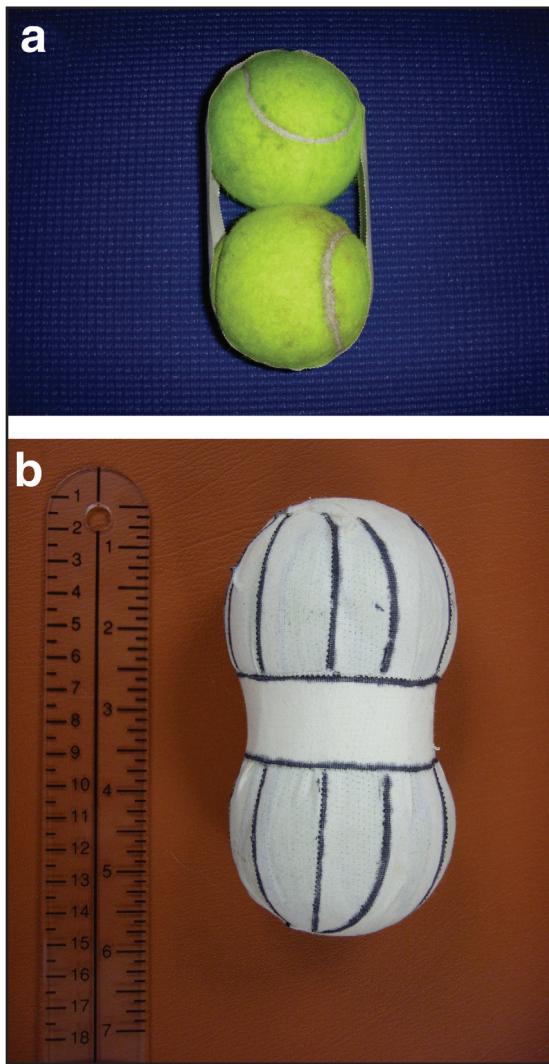


Figure 1. Self-mobilization device preparation. *a)* Athletic tape is applied from one end of one tennis ball around to the opposite end of the other tennis ball then back to the starting point to form initial ellipse-shape. *b)* Completed device with middle perpendicular strip applied.

graded on a 5-point scale¹⁴ with grades III and V used to improve joint mobility. Although patients may not fully understand graded mobilizations, the clinician can educate the patient on the appropriate mobilization range dependent on treatment goals and patient tolerance. Initially a patient may only be able to tolerate mobilization which is performed into resistance or up to the limit of the range of motion (analogous to Grade III mobilization).¹⁵ The patient may progress to utilizing a small-amplitude movement performed well into tissue resistance (analogous to Grade IV mobilization).¹⁵ Thoracic spine mini-crunches provide the patient the ability to control mobilization intensity and may be performed in a supine position

with arms crossed over the chest (Figure 2). Crossing the arms over the chest protracts the scapulae, allowing the tennis balls to contact the thoracic spine and ribs while minimizing contact with the scapulae. The device is placed at the desired level of mobilization along the thoracic spine, with the tennis balls resting lateral to the spinous process and the vertebral spinous process resting in the groove of the device (Figure 2a). Typically, the tennis balls would be placed one segmental level below the segment to be mobilized into extension. With arms crossed over the chest, the patient slowly raises their shoulders off of the ground for a count of 3 seconds and then back down to the ground (Figure 2c). Although there is little consensus regarding optimal number of sets or repetitions the authors suggest 2-3 sets consisting of 15 repetitive oscillations. During this maneuver, if the patient experiences intolerable pain or discomfort, the clinician may consider performing the exercise in an upright position with the tennis balls placed against a wall in order to decrease the force being placed on the transverse processes and ribs. Should the exercise continue to cause discomfort the clinician should explore other therapeutic options.

Supine Arm Circles

A second technique, called supine arm circles, may be used as a soft tissue mobilization. Some soft tissue dysfunction manifests in the form of trigger points, which may be alleviated with sustained pressure.¹⁶ Based on the placement of the device, this mobilization technique can be used to target costovertebral or costotransverse joints as well as muscles of the scapulothoracic region such as the rhomboid, trapezius, or levator scapulae muscles. The placement of the device should be at a point of discomfort; some patients might find relief from performing the exercise at several points in the thoracic area. This technique uses the device described previously and is performed in the supine position, with the device placed parallel to the thoracic spine (Figure 3a). The patient then forward flexes their shoulder to 90 degrees so that their arm is perpendicular with the ground (Figure 3b). Next, the patient rotates their shoulder in a clockwise or counterclockwise direction (i.e. traces small circles with their arm). Although there is no consensus regarding optimal number of sets or repetitions, the authors suggest

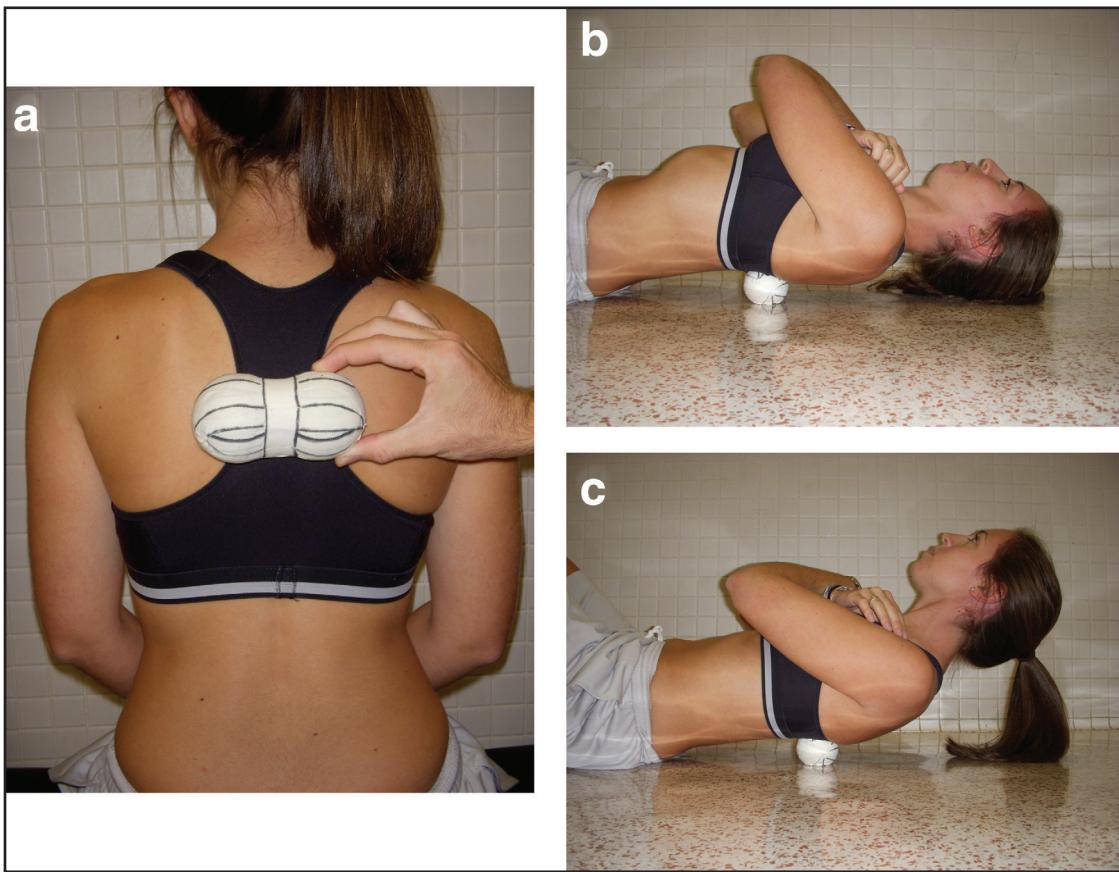


Figure 2. Thoracic Spine Mini-Crunches. *a)* Self-mobilization device is placed at the desired vertebral level for mobilization with the groove over the spinous process. *b)* Patient positioning with arms across chest. *c)* Patient raises shoulder off of the ground 5-6 inches (mini-crunch).

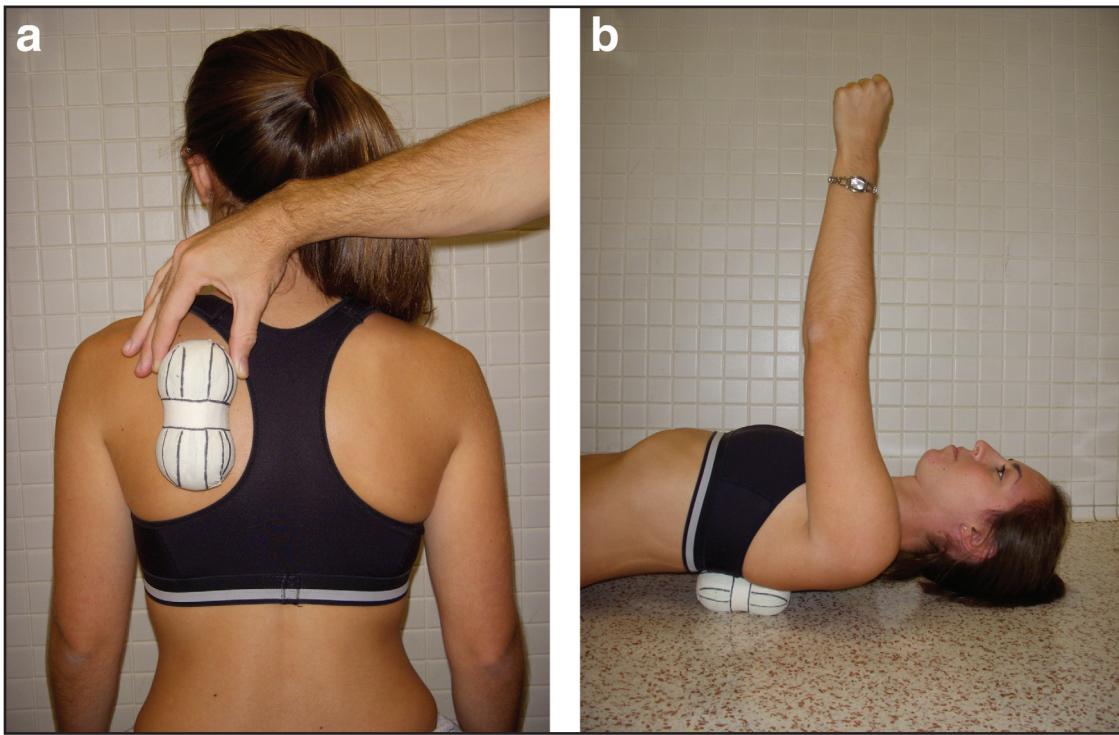


Figure 3. Supine Arm Circles. *a)* Self-mobilization device is placed at the desired position of mobilization parallel to the thoracic spine. *b)* Shoulder is forward flexed 90 degrees and arm is straight and perpendicular to the ground.

that the patient performs the exercise for 2-3 sets of 30-60 second bouts in both directions. Should the exercise cause discomfort, it may be modified in a similar manner as described for the thoracic spine mini-crunches.

DISCUSSION

Joint mobilizations are indicated when an impairment in joint mobility or a limitation in accessory joint motion is pathologic. Individuals with a history of back pain or referred pain that is suspected to be caused by a hypomobile joint in the thoracic region may benefit from these techniques. The ability of patients to perform a self-mobilization in the thoracic region may help maximize clinical rehabilitative outcomes, but joint mobilizations should not be used in patients with suspected fracture, hypermobile joints, neurological symptoms, or in individuals who are not comfortable performing the self-mobilization intervention.

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